

COURSE TITLE:	ASTRONOMY AND THE WORLD WIDE WEB		
NO OF CREDITS:	3 QTR CREDITS	WORK HRS:	90
INSTRUCTORS:	JEFF ADKINS , M.S.		
	2536 WHITETAIL DRIVE	925/777-0932	
	ANTIOCH CA, 98103	astronomer@attbi.com	

ASSIGNMENT CHECKLIST

The assignment checklist will help you plan your work. Check off items as you complete them.

400 & 500 LEVEL

A. INFORMATION ACQUISITION:

- _____ **Assignment #1. General Astronomy.** Complete 5 sections. E-mail a 1-2 page paper for each.
- _____ **Assignment #2. Astronomy News on the Web.** Subscribe to a newsletter. Write a 2-3 page paper.

B. LEARNING APPLICATION:

- _____ **Assignment 3. Software Review.** Write a review of astronomy software. Include use in lesson plans.
- _____ **Assignment #4. The Moon Project.** Observe moon phases for 2 weeks as described in syllabus.
- _____ **Assignment #5. Lesson Plan Development.** Based on #1 & #2, design a unit of 3 lesson plans.
- _____ **Assignment #6. Lesson Implementation with Students.** Teach. Write 2-3 page summary.
- _____ **Assignment #7. Student Assessment.** Students write a brief assessment and e-mail it to me.
- _____ **Assignment #9. Introducing Yourself.** ASAP post message to bulletin board as described in syllabus.
- _____ **Assignment #10. Listserv and FAQ review.** Post and respond at least 1 bulletin board message.
- _____ **Assignment #11. Sharing images on-line.** E-mail me 3 astronomical images with captions.

500 LEVEL ASSIGNMENT:

- _____ **Assignment #12. Using Connected Schools to Teach Astronomy.**

In addition to the 400 level assignment do the following:

- Complete 2 units from General Astronomy
- Devise a unit from connected schools. Write a 2-3 page synopsis.

400 & 500 LEVEL

_____ **Assignment #13. SELF-REFLECTION & INTEGRATION PAPER:**

- Write a 1-2 page summary of your Self-Reflection Journal.
- Write a 2-3 page Integration Paper as described in the syllabus.

NOTE:

You may work collaboratively and submit joint assignments on all but the Self-Reflection and Integration Paper that must be individually authored and submitted.

Alternatives to written assignments (videos, audio tape, photo collage, collection of products, letter to editor, brochure, and WEB pages, etc.) may be submitted with prior approval.

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COURSE DESCRIPTION:

Astronomy is one of the sciences that easily captures the imagination, but it is often poorly understood by both young people and adults. In this course, teachers will take advantage of the great variety of fascinating astronomy-related information and teaching resources on the World Wide Web (WWW) to help teach astronomy to K-12 students. You will learn about many of the major concepts and topics in astronomy, including black holes, galaxies, comets and meteors, the lives of the stars, and other life in the universe. Using observations of the moon in the evening sky, you and your students will learn to explain the phases of the moon. You will learn to make astronomy come alive for yourself and your students.

NOTE PREREQUISITE:

Some prior Internet experience (e-mail, etc.) and WWW access either through a home PPP or SLIP account, direct WWW connection at your school or an online service that supports WWW and Internet listervs is required. Netscape Navigator or Internet Explorer are preferred for those with their own connection. Several assignments require student work or student evaluation of your lesson plans so you need access to a class of students. Contact the instructor if you are working on this class during the summer.

LEARNING OUTCOMES

Upon completion of this, participants are expected to have:

1. A working knowledge of major concepts in astronomy.
2. A working knowledge of the World Wide Web and use of Web browsers.
3. The ability to incorporate relevant topics from astronomy into daily lessons.
4. The ability to incorporate various pages from the WWW into age-level-appropriate lessons.
5. Experience in teaching and evaluating hands-on lessons in astronomy that include WWW pages.

COURSE REQUIREMENTS:

Following are the general course requirements weighted for determining the granting of university credit. Antioch University requires 75% or better to issue credit at the 400 level and 85% or better to issue credit at the 500 level.

- | | |
|--|-----|
| 1) Completion of Information Acquisition assignments | 30% |
| 2) Completion of Learning Application assignments | 40% |
| 3) Completion of Self-reflection & Integration assignments | 30% |

NOTE: Please save your papers as ASCII text (or equivalent) before sending them to me.

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INFORMATION ACQUISITION 30%

To gain knowledge in the subject of astronomy and skill in using the Internet as a vehicle for knowledge acquisition, course participants will do the following assignments:

_____ Assignment #1. General Astronomy.

- The General Astronomy section consists of nine areas. ONLY five are required 400 level credit. This allows the course participant to choose what best suits her or his needs. Most topics involve the detailed exploration of one or more Web sites. Unless the topic says otherwise, you should e-mail me a separate 1-2 page paper for each of the five areas that you complete in which you describe the highlights of the astronomy presented in that area. See bibliography at end of document for the WWW site list.
- Maintain an idea and self-reflection journal in which you record random thoughts, inspirations, difficulties and high points relative to the course. Feel free to include personal or emotional comments as well. Review your journal.

1. **The Solar System.** Make use of WWW sites to explore the major members of the solar system. Take the tours and then learn the secrets of how it got to be the way it is!
2. **Comets, Asteroids, and Meteors.** The smallest members of our solar system can have profound yet beautiful influences on planets and people. Learn how to observe meteor showers and get a preview of what may be a great comet.
3. **Lives of The Stars.** Learn the ultimate fate of the sun as you learn what makes stars form and evolve.
4. **Exploring The Milky Way Galaxy.** Discover the what makes up our galaxy.
5. **Black Holes** - mysterious and foreboding. Learn how black holes can form, their strange effects on time and space and how astronomers look for them.
6. **Galaxies.** Explore the size, shape and history of galaxies.
7. **Life in the Universe.** Recent discoveries of possible planets has made this a hot topic. Learn about the possible newplanets, what the prospects for life are and how people are looking for it.
8. **Space Places.** Use the WWW to learn about observatories or planetaria and how they work, take virtual tours of realobservatories, or make a real visit (encouraged, but optional) to an observatory (preferred) or planetarium.
9. **Observing the Night Sky.** Use tips and information from the WWW to find ut what is in the evening sky that is worth seeing. Spend at least a five evenings a month for three months under the stars. If available, use binoculars or a small telescope (remember your eyes alone work just fine too!). Keep notes (with sketches or photographs of the sky if you like) on your observing (what, were, when). Feel free to comment on the usefulness of WWW help, your impressions of the sky and/or individual astronomical objects, and whatever else you feel is important.

NOTE:

Upon completion, mail your observing notes to me.

In this observing project you can mention the moon, but don't make it the centerpiece of your project - See #4 below.

400 & 500 LEVEL

EVALUATION GUIDE:

The Evaluation Guide papers in this assignment are listed below. In general, follow these guidelines when writing web site reviews or overviews for this course. Papers for this assignment should show evidence that the student has done the following:

- Visited all major sections of each individual site (internal links only)
- Evaluated the web site for use with your classes
- Noted specific information, lesson plans, pages, etc., Which could be used in your classes
- Cited specific astronomy information presented at the web site
- Provided clear and well organized communication of the above (including grammar, spelling, etc.)

_____ Assignment #2. Astronomy News on the Web.

Here, course participants will get the scoop on using the Web to keep current on events in astronomy. Make regular visits to the astronomy news and current information sites and post interesting links to the course [bulletin board](#): You should subscribe to an astronomy newsletter such as Star Trak or equivalent. Subscription information is in the course bibliography. One of the newsletters should be forwarded to the instructor to show your address in the newsletter mail header. Also, put together a 2-3 page paper on the most interesting astronomical news items. Send this paper to your [instructor](#).

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LEARNING APPLICATION:

Here is the chance to put all the astronomical goodies from section one to use into your classroom. This will involve the following assignments:

_____ Assignment 3. Software Review

You will either purchase or download a demonstration version of some astronomy software useful in making astronomical predictions, try it out, and write a short review of it which you will share via the class listserv. Avoid using canned lessons such as encyclopedias; use software which requires user input such as planetarium software, observing scheduling software, eclipse and satellite predictors, and so on. The review should include suggestions about how to use the software in specific lesson plans.

As with any executable file, users should have a modern virus checker installed on their computers prior to downloading.

The course bibliography has a couple of links to get you started, but you should not feel limited to the list posted there when searching for software.

_____ Assignment #4. The Moon Project

This is a strategy to be used for teaching about the phases of our moon. It requires joint observations (by you and your students) of the moon in your evening sky at the same time every night for a period of two weeks. These observations will be used to teach the phases of the moon (detailed information about this project can be found at the end of this syllabus).

_____ Assignment #5. Lesson Plan Development

Based on your explorations in assignments #1 & #2, design an integrated thematic unit consisting of at least 3 lesson plans per unit for 1 of the topics or subtopics. Be sure to include the list of materials and WWW sites that students will be referred to and detail the other technology (printed materials, etc.) that you will use. Please use your own school's standard lesson format (if you need one - ask). Be sure to include:

- Grade Level
- Topic
- Learning Objectives
- Materials/Equipment
- Class Activities & Instructional Strategies
- Extensions and Follow-up
- Detail of the Student Assessment

Send both units to your instructor.

_____ Assignment #6. Lesson Implementation with Students.

Put the unit from #5 into place with your students. Upon completion of your lesson, summarize the results in a 2-3 page paper that:

- Identifies The Unit Taught
- Describes The Grade Level And Student Population
- Describes How The Lesson Went Over, Including What Could Be Improved
- Your Assessment Of Student Learning
- Where You Go From Here

_____ Assignment #7. Student Assessment

Have several students write a brief assessment of your teaching unit and e-mail it to me. Use a common guideline for the assessment, such as a list of questions with rank order numbers. Make sure a general, open-ended comments section is included in the assessment the students make. You can accumulate student comments and email them on their behalf if your school does not provide Internet access for students.

_____ Assignment #9. Introducing Yourself.

As early as possible in the course, post an introductory message to the class bulletin board announcing who you are, your grade level, school, location, personal interests and whatever else you might want to share.

_____ Assignment #10. Listserv and FAQ review.

Students should post at least one message to the class bulletin board containing astronomical information of general interest to the class, and respond to one posting as well. Copy the instructor on the response.

_____ Assignment #11. Sharing images on-line

Students should submit 3 (three) astronomical images of the sun, moon, stars, or other celestial object through email to the instructor. Images of your classes at work on an astronomical project are acceptable. The image can be submitted as a photograph through the mail if you do not have access to an electronic camera, scanner or photo CD supplier. The instructor will mail a scanned image back to you. Photographs will be returned. Photographs should be original work and permission should be sought for posting the images on the class website. Selected photographs will be added to the class web site. A caption should accompany the photo(s).

500 LEVEL ASSIGNMENT:**_____ Assignment #12. Using Connected Schools to Teach Astronomy.**

In addition to the 400 level assignment do **two** units from General Astronomy (#1) and:

- Devise a unit that takes unique advantage of making astronomical measurements from connected schools in different locations (the farther away the better!).
- Detail the unit the same as #4 above and then try it out.
- Write a 2-3 page synopsis of the unit, how using the Internet was useful to the project, how you would change things the next time you try it, and comment on the overall effectiveness of the unit as a whole.

SUMMER OPTION:

Include a 2-3 page fictional narrative of the unit that would include any possible difficulties in completing the unit, sample student responses, etc. Submit this paper to your instructor.

400 & 500 LEVEL**_____ Assignment #13. SELF-REFLECTION AND INTEGRATION PAPER:**

- Summarize your Self-Reflection Journal in 1-2 pages and send along with your Integration Paper.
- Write a 2-3 page Integration Paper to send to your instructor in which you respond to the following:
 1. What were your goals for taking this course and to what degree did you achieve them?
 2. What did you find most helpful about the course and why was it helpful?
 3. What would you do differently in another similar course?
 4. In what way do you think the course could be improved?
 5. Evaluate your instructor, course materials and direction given to you.

REQUIRED READING:

This course is designed to be done online using the linked syllabus to access course materials available at various online websites. Please go to our website at <https://www.hol.edu> to view the linked syllabus.

MATERIAL FEE:

There is no additional material fee to be paid after registration.

INSTRUCTOR COMMENTS ON WORK:

If you wish to receive the instructor's comments on your work, please indicate that to him when you submit your assignments via email.

MOON OBSERVING PROJECT - DETAILED DESCRIPTION

Assignment #4. Moon Observing Project

Part One: Moon observing project that you and your students will complete.

Part Two: An exploration of how to go about teaching the phases of the moon and thus explaining the observations. It is really important NOT to prep the kids in advance as to what is going on. It is equally important to NOT try to explain the effect of moon phases until they have seen the effect.

Believe it or not, the causes of the phases of our moon are misunderstood by many, many people. Teaching this concept may be more difficult than you realize.

As you proceed, you will no doubt have questions, but you probably won't know what they are until you try to actually do the activity. When in doubt, post those questions to the class listserv!

OBSERVING PROJECT:

The goal of this observing project is to understand the monthly cycle of the motions and phases of the moon. To accomplish this goal, you and your students will observe the moon every night, at the same time of night, for two weeks after new moon. Pick a time of evening for which you can observe the moon every night for two weeks. If the time you pick is say, 2 hours after sunset, then you should start your 2-week observing period about 2 days after new moon. If your observing time is 3 hours after sunset, then start about 3 days after new moon. (Get the idea?) If you are working with younger kids, start your observations early in the evening.

For this course, new moon dates occur on 5/23/2001, 6/21/2001, 7/20/2001, 8/19/2001, 9/17/2001, 10/16/2001, 11/15/2001, 12/14/2001. Your goal is to accurately record the appearance of the moon and its position in the sky every night for your 2-week observing period.

Since you are recording the moon's position every night at the same time, you are recording the moon's motion as it orbits earth. Earth's rotation will spin you back to the same position in space for each observation.

FOR YOU:

The heart of this project will be 1 diagram you will produce that shows the horizon, and which stretches from East (on the left) through South (in the middle) to West (on the right). You will record the moon's position on this diagram each night. Accompanying this will be a sketch of the moon's shape for each night's observation. You should aid your students in producing the same set of diagrams as well.

Measuring the position of the moon each night is not hard, and you don't need to observe from the same location. First identify the direction south. An easy way is choose a place where you can look down a north-south running city street. For your unit of measure, use your fist held at arm's length. Find some point on the horizon that is due south, then measure how many fists to the east (left) or west (right), and how many fists above the horizon the moon is. Then block off your diagram in "fist units" and plot the moon's position nightly.

KEEP AN OBSERVING LOG. It should include, for each night:

1. The date, time, and location of observation.
2. Measurements of the moon's position. Clarity and consistency are the goals. Avoid vagueness at all costs.
3. A detailed description of what you saw, including a drawing of the moon. You don't need to be a great artist, but be accurate and consistent. Make all drawings to the same scale. Choose a certain size circle - for example, trace around a quarter. Always start with this same size circle for your drawings.

PLEASE NOTE:

It is just as important to fill out an observing log for nights when you saw nothing because of, say, bad weather.

FOR YOUR STUDENTS:

If your students are too young (in your opinion) to make observations of the position of the moon in addition to its shape, have them record only its shape. Using a blank calendar works very well for this. However, YOU should record the moon's position regardless of their age or ability. I highly encourage sending a note home about the project. This keeps the parents involved with what their kids are doing in your room and gives them an extra reminder to do it. Also, I recommend a practice session on the fist method of measuring the moon's position. Pick some distant object visible from your school and compare results and techniques. After the observations are done, you are going to have some explaining to do.

WHAT IF THE MOON IS NEVER VISIBLE DUE TO OUR CLOUDY SKIES?

Many students of this course note that in the Pacific Northwest, months can pass without an appropriate window of time when the moon is visible for this project. Naturally, this can be frustrating. However, there is a way around it. Keeping in mind that the primary purpose of this assignment is to get away from the computer and observe the real sky, you can simulate the real sky with any number of free or commercial sky simulator programs. (See the Software Evaluation section of the bibliography.) This enables you to fill in gaps in missing observations, confirm observations that have been made, or simulate the entire project if necessary. The teacher could display the current simulated moon on a computer screen and ask students to sketch it in their observing log.

Simulated observations should be noted and should only be used as a last resort if the real sky is not visible. There's just no substitute for looking at these things with your own eyes!

TEACHING MOON PHASES.

Teaching about the phases of the moon is difficult. Many people, of all ages, have a completely wrong idea about moon phases. Most have never really looked at the moon in a organized way over a period of time. It is my experience that the whole project works best if you have the students make predictions about what they will see if they observe the moon every night for two weeks, then have them observe the moon, and then discuss why the moon does what it does. A key point is to find out what they think is going on - challenge and defeat the incorrect parts of what they believe (not as hard as you might think) and then demonstrate the truth to them.

Activities doing just that are available from the Lake Afton Public Observatory at: <http://webs.wichita.edu/lapo> Make sure that you do the Demonstrating Moon Phases activity. In my opinion it is the ONLY way to really explain the whole thing.

TO RECAP. The moon observing project needs to include the following:

1. One diagram showing the position of the moon in the sky at the same time of night for two weeks (produced by you alone or with your class).
2. A log of your observations, as described above.
3. A summary of the observations, taken as a whole. What patterns did you and your students see in the moon's changing position, what were the overall changes in the moon's appearance like, etc?
4. A short reaction paper about the effectiveness of the whole process, how the events transpired, what you changed, etc
5. Samples of the student's work and their comments on the project (they can even write to me about it). For this activity, pack everything together and SNAIL MAIL it to me (sorry about that). Feel free to try out any of your ideas or questions on me at any time along the way.

ASTRONOMY AND THE WORLD WIDE WEB BIBLIOGRAPHY

ASSIGNMENT #1

THE SOLAR SYSTEM

<http://www.seds.org/nineplanets/nineplanets/nineplanets.html>

The Nine Planets

http://my.voyager.net/stargazer/solar_system.html

http://www.bradley.edu/las/phy/solar_system.html.html

Views of the Solar System

COMETS, ASTEROIDS, AND METEORS

<http://encke.jpl.nasa.gov/>

Comet Home Page

<http://medicine.wustl.edu/~kronkg/index.html>

Comets and Meteor Showers

<http://www.skypub.com/comets/comets.html>

SKY Online's Comet Page

<http://comets.amsmeteors.org>

Comets

LIVES OF THE STARS

<http://www.twsu.edu/~obswww/lss.html>

Life Story of a Star

<http://seds.lpl.arizona.edu/billa/twn/>

The Web Nebulae

BLACK HOLES

<http://physics7.berkeley.edu/Bhfaq.html>

BLACK HOLES by Ted Bunn

<http://lean-luc.ncsa.uiuc.edu/Moview/movies.html>

NCSA Relativity Group Movies

<http://www.twsu.edu/~obswww/o34.html>

Amazing Facts re: Black Holes

http://enemy.gsfc.nasa.gov/htmltest/rjn_bht.html

Virtual Trips to Black Holes and Neutron Stars

<http://ucsu.colorado.edu/~peterscc/bh.html>

Blackhole

ASSIGNMENT #1

(Continued)

EXPLORING THE MILKY WAY

<http://www.twsu.edu/~obswww/emw.html>

Exploring the Milky Way

GALAXIES

<http://crux.astr.ua.edu/choosepic.html>

Different Categories of Pictures

<http://www.cnede.iastate.edu/staff/jtroeger/galaxies.html>

Exploring Galaxies

<http://www.telescope.org/btl/m4.html>

Galaxies

<http://seds.lpl.arizona.edu/messier/galaxy.html>

Galaxies

<http://zebu.uoregon.edu/movie.html>

Galaxy Gallery Page IV: The Movies

LIFE IN THE UNIVERSE

http://www.empire.net/~whatmoug/Extrasolar/extrasolar_visions.html

Extrasolar Visions

<http://www.seti-inst.edu/>

Welcome to the SETI Institute

SPACE PLACES

<http://www.yahoo.com/Science/Astronomy/Planetaria/>

Yahoo - Science: Astronomy: Planetaria

<http://www.yahoo.com/Science/Astronomy/Observatories/>

Yahoo - Science:Astronomy: Observatories

<http://www.skypub.com/astro/astrodir/usa.html>

S&T's Astro Directory - United States

OBSERVING THE NIGHT SKY

<http://www.skypub.com/whatsup/whatsup.html>

SKY Online - What's Up?

<http://www.skypub.com/backyard/backyard.html>

SKY Online - Backyard Astronomy

<http://www.kalmbach.com/astro/SkyEvents/SkyEvents.html>

Astronomy Almanac

<http://www.pa.msu.edu/abrams/diary.html>

SKYWATCHER'S DIARY

http://or.sunflower.org/~starwalk/current_sky.html

Que tal in the Current Sky

ASSIGNMENT #2

ASTRONOMY NEWS SOURCES ONLINE

<http://antwarp.gsfc.nasa.gov/apod/astropix.html>

Astronomy Picture of the Day

<http://www.skypub.com/news/news.html>

SKY Online -- Weekly News Bulletin

<http://www.stsci.edu/pubinfo/Latest.html>

Latest HST Release

<http://www.chron.com/content/interactive/space/astronomy/>

Houston Chronicle

<http://www.nasa.gov/today/index.htm>

NASA Today

<http://science.msfc.nasa.gov/subscribe.htm>

NASA News Listserv

INFORMATION ABOUT SUBSCRIBING TO STAR-TRAK

Star Trak is written monthly by Hal Kibbey of the Indiana University Office of Communications and Marketing and is available from the following sources:

USENET Newsgroups :

Posted to the sci.astro.amateur and sci.astro.newsgroups.

WORLD WIDE WEB:

<http://www.astro.indiana.edu/startrak.html>

<http://www.iuinfo.indiana.edu/ocm>

<http://www.astro.indiana.edu/startrak-spanish.html>

EMAIL SUBSCRIPTIONS

English

Send Email subscription requests to:

star-trak-adm@astro.indiana.edu

Subject: subscribe star-trak

or Subject: unsubscribe star-trak

Spanish

Send Email subscription requests to:

star-trak-spanish-adm@astro.indiana.edu

Subject: subscribe star-trak-spanish

or Subject: unsubscribe star-trak-spanish

Another astronomy related list server can be found at the following address:

<http://spacelink.nasa.gov/xh/express.html>

ASSIGNMENT #3

ASTRONOMY SOFTWARE SOURCES ONLINE

<http://www.siennasoft.com/eng/downloads.shtml>

Free Starry Night Basic software

NOTE: 10-day free demo. Requires payment of a registration fee for permanent use.

<http://www.skypub.com/resources/software/software.shtml>

A listing of Sky Publishing's resources: free software in BASIC format, programs from shareware vendors, and advertising from publishers. Macintosh software is not listed here.

<http://www.shareware.com/>

A searchable site which yields many hits when you search for "astronomy" by operating system (Mac or Windows)

<http://www.maris.com/kdgfolder/astronom/rs3/rs3home.htm>

Link to Maris Software's Redshift 3 site, a commercial product for Macintosh and Window